



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/572,590

03/20/2006

Takashi Takeuchi

043888-0456

3392

53080 7590 08/19/2009  
MCDERMOTT WILL & EMERY LLP  
600 13TH STREET, NW  
WASHINGTON, DC 20005-3096

EXAMINER

BEST, ZACHARY P

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

08/19/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/572,590	<b>Applicant(s)</b> TAKEUCHI ET AL.	
	<b>Examiner</b> Zachary Best	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-16 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**NON-AQUEOUS ELECTROLYTE SECONDARY BATTERY WITH  
IMPROVED HIGH PERFORMANCE AND SAFETY EVEN WHEN CHARGED  
TO A HIGH VOLTAGE AT A HIGH TEMPERATURE**

Examiner: Z. Best    S.N. 10/572,590    Art Unit: 1795

**DETAILED ACTION**

1. Applicant's amendment filed August 5, 2009 was received. The specification was amended. Claims 1-5 and 7-15 are currently pending examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Specification***

3. The title of the invention is needlessly convoluted and not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. Examiner suggests "NON-AQUEOUS ELECTROLYTE SECONDARY BATTERY WITH" either "COMPOSITE OXIDE POSITIVE ELECTRODE ACTIVE MATERIAL" or "LAMINATED SEPARATOR."

***Claim Rejections - 35 USC § 112***

4. The claim rejections under 35 U.S.C. 112, first paragraph of Claims 1-5 and 7-15 are withdrawn because Applicant's arguments were persuasive.

***Claim Rejections - 35 USC § 102***

5. The claim rejections under 35 U.S.C. 102(b) of Claims 1-4, 7, 13, and 15 as being anticipated by Tanaka et al. are withdrawn because Applicant's arguments were persuasive.

***Claim Rejections - 35 USC § 103***

6. The claim rejections under 35 U.S.C. 103(a) of Claims of Claims 5, 8-12, and 14 as being unpatentable over Tanaka et al. in view of Lee et al. are withdrawn because Applicant's arguments were persuasive.

7. Claims 1-3, 5, 7-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohzuku et al. (JP 2003-086183 A) in view of Takahashi (US 5,856,039 A). Further references to Ohzuku et al. will be based on corresponding US 2004/0058243 A1).

Regarding Claims 1-3, Ohzuku et al. teach a non-aqueous electrolyte secondary battery comprising a positive electrode, a negative electrode, a separator interposed between said positive electrode and said negative electrode, and an electrolyte (par. 138), wherein said positive electrode comprises a positive electrode active material comprising a particle of a composite oxide (par. 78) having the general formula  $\text{LiNi}_{2/3}\text{Mn}_{1/3}\text{O}_2$  (par. 71), wherein aluminum is doped in the amount of 0.05-20 atom % of the three transition metals (par. 84), wherein Mn is uniformly distributed (par. 21) and the Al is more in a surface portion of said particle than an inside of said particle (par. 80). Examiner believes the resultant positive

Art Unit: 1795

electrode material is obvious in range or anticipates the general formula found in Claim 1.

However, Ohzuku et al. fail to teach said separator comprises a plurality of laminated monolayer films.

Takahashi teaches a non-aqueous electrolyte secondary battery (abstract) having a plurality of laminated monolayer films (col. 2, lines 13-16), said plurality of monolayer films each have a fine porous structure (col. 2, lines 13-16), having a positive electrode-side monolayer film comprising polypropylene (col. 2, lines 12), such that the separator will have a high piercing strength and high shut-down characteristic (col. 1, lines 53-56). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the separator of Takahashi, as described above, in the secondary battery of Ohzuku et al. because Takahashi teaches said separator has a high piercing strength and high shut-down characteristic.

Regarding Claim 5, Takahashi teaches the positive electrode-side monolayer film further comprises polyethylene (col. 2, line 5), wherein there is not less than 60 wt% of polypropylene (col. 2, lines 18-20).

Regarding Claim 7, Ohzuku et al. teach the secondary battery as described above. While Ohzuku et al. does not specifically teach that the radius of said particle with regards to Al distribution, it is Examiner's position that the similar process steps, materials, and material amounts the radius of Al distribution will be inherent. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is

necessarily present in that which is described in the reference. *In Re Roberston* 49 USPQ2d 1949 (1999).

Regarding Claims 8-9, Takahashi teaches that the monolayers melt down at about 130° C (col. 5, lines 17-18).

Regarding Claim 10, Takahashi teaches the polypropylene is 20% or lower and has a melting temperature of about 130° C (col. 6, lines 38-45).

Regarding Claim 11, Takahashi teaches the melt temperature is about 130° C and a separator thickness of 25  $\mu\text{m}$  (col. 7, lines 35-60).

Regarding Claim 12, Takahashi teaches that the multilayered film is such that the middle layer will maintain the shut-down characteristic while the end layers will maintain the high piercing strength (col. 2, lines 24-39). Takahashi further teach the final thickness of the multilayered separator is 20-35  $\mu\text{m}$  (col. 2, line 59). Therefore, it would have been obvious to one having ordinary skill in the art to adjust the thickness of each layer in the multilayered film in order to balance the piercing strength and the shut-down characteristics in the multilayered film of Takahashi. Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980).

Regarding Claims 13 and 15, Ohzuku et al. and Takahashi teach the secondary battery as recited above. It is noted that Claim 13 is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed.Cir. 1985). The secondary battery taught by Ohzuku et al. and Takahashi is

obvious to that of Applicant's, and therefore, Applicant's process is not given patentable weight in this claim.

Regarding Claim 14, Takahashi teaches the importance of the shut-down feature as a means to close the fine pores of the separator (col. 1, lines 14-28), wherein the multilayered separator has one shutdown layer sandwiched between two other separator layers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the pore size of the individual layers of the separator in order to ensure that the shutdown layer will fill the pores of the non-shutdown layers. Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980).

8. Claims 1, 4-5, and 7-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pouillier et al. (Pouillier, C., et al. "Synthesis and Characterization of New  $\text{LiNi}_{1-y}\text{Mg}_y\text{O}_2$  Positive Electrode Materials for Lithium-Ion Batteries." Journal of The Electrochemical Society, 147(6) (2000): 2061-2069.) in view of Ohzuku et al. (JP 2003-086183 A) and Takahashi (US 5,856,039 A). Further references to Ohzuku et al. will be based on corresponding US 2004/0058243 A1).

Regarding Claims 1 and 4, Pouillier et al. teach a rechargeable lithium battery (pg. 2061, a lithium battery would inherently have a positive electrode, a negative electrode, a separator, and an electrolyte) with a positive electrode active material having the general formula  $\text{LiNi}_{0.98}\text{Mg}_{0.02}\text{O}_2$  (pg. 2064, Table III) created by coprecipitation (abstract).

Art Unit: 1795

However, Pouillier et al. fail to teach the addition of element L or the separator comprising a plurality of laminated monolayer films.

Ohzuku et al. teach a rechargeable lithium battery wherein a coprecipitated composite oxide is doped with aluminum such that the aluminum concentration is in the vicinity of the surface of the oxide particle (par. 80) such that the aluminum will increase the potential of the positive electrode active material (par. 80). Therefore, it would have been obvious to one having ordinary skill in the art to modify the coprecipitated oxide by doping with aluminum because Ohzuku et al. teach doping the positive electrode active material with aluminum will increase the potential of said active material. Examiner believes the resultant positive electrode material is obvious in range or anticipates the general formula found in Claim 1.

Takahashi teaches a non-aqueous electrolyte secondary battery (abstract) having a plurality of laminated monolayer films (col. 2, lines 13-16), said plurality of monolayer films each have a fine porous structure (col. 2, lines 13-16), having a positive electrode-side monolayer film comprising polypropylene (col. 2, lines 12), such that the separator will have a high piercing strength and high shut-down characteristic (col. 1, lines 53-56). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the separator of Takahashi, as described above, in the secondary battery of Pouillier et al. and Ohzuku et al. because Takahashi teaches said separator has a high piercing strength and high shut-down characteristic.



Regarding Claim 5, Takahashi teaches the positive electrode-side monolayer film further comprises polyethylene (col. 2, line 5), wherein there is not less than 60 wt% of polypropylene (col. 2, lines 18-20).

Regarding Claim 7, Ohzuku et al. teach the secondary battery as described above. While Ohzuku et al. does not specifically teach that the radius of said particle with regards to Al distribution, it is Examiner's position that the similar process steps, materials, and material amounts the radius of Al distribution will be inherent. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. *In Re Roberston* 49 USPQ2d 1949 (1999).

Regarding Claims 8-9, Takahashi teaches that the monolayers melt down at about 130° C (col. 5, lines 17-18).

Regarding Claim 10, Takahashi teaches the polypropylene is 20% or lower and has a melting temperature of about 130° C (col. 6, lines 38-45).

Regarding Claim 11, Takahashi teaches the melt temperature is about 130° C and a separator thickness of 25  $\mu\text{m}$  (col. 7, lines 35-60).

Regarding Claim 12, Takahashi teaches that the multilayered film is such that the middle layer will maintain the shut-down characteristic while the end layers will maintain the high piercing strength (col. 2, lines 24-39). Takahashi further teach the final thickness of the multilayered separator is 20-35  $\mu\text{m}$  (col. 2, line 59). Therefore, it would have been obvious to one having ordinary skill in the art to adjust the thickness of each layer in the multilayered

film in order to balance the piercing strength and the shut-down characteristics in the multilayered film of Takahashi. Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980).

Regarding Claims 13 and 15, Pouillierie et al., Ohzuku et al., and Takahashi teach the secondary battery as recited above. It is noted that Claim 13 is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed.Cir. 1985). The secondary battery taught by Pouillierie et al., Ohzuku et al., and Takahashi is obvious to that of Applicant's, and therefore, Applicant's process is not given patentable weight in this claim.

Regarding Claim 14, Takahashi teaches the importance of the shut-down feature as a means to close the fine pores of the separator (col. 1, lines 14-28), wherein the multilayered separator has one shutdown layer sandwiched between two other separator layers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the pore size of the individual layers of the separator in order to ensure that the shutdown layer will fill the pores of the non-shutdown layers. Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980).

***Response to Arguments***

Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/572,590  
Art Unit: 1795

Page 11

Zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795